

Warren Dixon, Ph.D.

NSF, \$300,000 – "Implicit Learning-Based Optimal Control of Uncertain Nonlinear Systems"

This research focuses on solving optimal control problems for uncertain nonlinear systems, with extensions to differential games. The work is purely mathematical, but can be applied to any scenario involving competing resources.

Air Force, \$40,000 – "Simultaneous Localization and Mapping" This work focuses on networks of agents and sensing through an imager. The work could be applied to a network of drones, but that is not the primary focus.

Air Force, \$379,252 – "Vision-Based Guidance and Control Algorithms Research" This work is also focused on a network of agents. The goal is to have a multiple robots coordinate their sensing outcomes. Initial applications have focused on air and ground robots interacting.

Rick Lind

PI Rick Lind

Sponsor University of Michigan, Air Force

Amount \$390,000

Title Biologically-Inspired, Anisotropic Flexible Wing for Optimal Flapping Flight

Summary This project is studying the fundamental physics associated with flapping-wing aircraft. The research investigates aeroelastic modeling and control strategies. The tasks do not include making a vehicle capable of flight.

PI Rick Lind

Sponsor NASA

Amount \$1,000

Title Award for Participation in the 2011 Hybrid Rocket Competition

Summary This project requires design and launching of a small hobby-class rocket.

Non-Funded purchases

Description : 9 fixed-wing aircraft with wingspan of 6 feet

Altitude limits : 2000 feet

Range and Duration limits : 3 miles and 20 minutes

Weapon carrying capability : anything less than 1 pound could be carried

Operating manual : not included

Video or static imagery capability : could carry a camera less than 1 pound

Description : 3 rotary-wing aircraft with blade span of 18 inches
Altitude limits : 500 feet
Range and Duration limits : 500 feet and 5 minutes
Weapon carrying capability : anything less than 0.25 pounds could be carried
Operating manual : included
Video or static imagery capability : could carry a camera less than 1 pound

Description : 6 fixed-wing aircraft with span of 2 feet
Altitude limits : 2000 ft
Range and Duration limits : 2 miles and 20 minutes
Weapon carrying capability : anything less than 0.5 pounds could be carried
Operating manual : not included
Video or static imagery capability : carry small video cameras

Subrata Roy

Air Force, \$155,448

"Demonstration of a Wingless Electromagnetic Air Vehicle (WEAV)"

WEAV is a patented concept vehicle which employs no moving parts and assures near instantaneous response time with 360 deg maneuverability. This project was for fundamental development of a plasma based propulsion system using atmospheric medium.

Loc Vu-Quoc

Sponsor: Lockheed Martin Corporation

Title: Wildfire Surveillance System

Description: Produce a technologically advanced system for firefighters that integrates unmanned aerial fire surveillance, tactical planning, and communication so to introduce superior intelligence, usability, coordination, and cost effectiveness compared to traditional systems.

Sponsor: Lockheed Martin Corporation

Title: Telescoping UAV wing

Description: Design, fabricate, and test a composite extensible (telescoping) wing to increase the flight time for a missile or for an unmanned aerial vehicle (UAV). The wing incorporates several mechanisms for deployment, and is adaptable to several different flight systems.

Andrey Soloviev

Navy, \$25,000

"Synthetic aperture gps-based attitude"

Development of GPS signal processing techniques to enable attitude determination and jamming mitigation for small-size platforms. The approach uses principles of synthetic aperture where antenna motion is applied to generate large phased arrays with small physical antennas.

Airforce, \$239,924

"Multi-sensor integration strategies: Development of multi-sensor algorithms for navigation in GPS-denied and GPS-challenged environments"

The methodology uses inertial navigation as a core sensor and applies other information (when available) to mitigate drift in inertial outputs.

Army, \$150,816

"Multi-sensor geolocation for detection and discrimination of unexploded ordnance"

Use of deep GPS/Inertial integration for enabling precise geo-location capabilities in dense forestry areas. A software receiver architecture is being developed that applies inertial sensor data to extend GPS signal accumulation interval thus enabling recovery of satellite signals attenuated by canopy.